

APPLIED DYNAMICS

PRODUCTS & SERVICES

ABOUT APPLIED DYNAMICS

ABOUT AD COMPUTERS

AD-24

AD-40

AD-64

AD-80

AD-256

HYBRID

SPECIAL SYSTEMS

COMPONENTS

SERVICES



The goal of Applied Dynamics is to serve our customers with the best technical product backed by superior application and service support, i.e., to see that our customer's problems are solved. Company policy, organization, and attitude of every person on the Applied Dynamics team is geared to this goal.

Our product development program is guided by the latest research in analysis methods coupled with constant awareness of where these new and powerful tools may be used to get results in the scientific computer laboratory. Computer requirements thus established determine hardware specifications. Development and design of the required computer elements apply advanced circuit technology and state-of-the-

art components to these specifications. Careful testing and conservative specification of performance result in a product that consistently and reliably produces accurate results.

There has been a dramatic growth of Applied Dynamics since its incorporation in 1957. Today, the company has assumed a position of leadership in the technology and production of high-speed, high accuracy, analog and hybrid computer components and systems. This success is due not only to an increasing recognition, by research and engineering laboratories, of the problem solving power of modern hybrid computing systems, but is also the result of Applied Dynamics' capability to provide products of superior technical performance backed by application know-how, service and a record of proven performance second to none.



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## ABOUT APPLIED DYNAMICS

### ABOUT AD COMPUTERS

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SPECIAL SYSTEMS

**INDUSTRY'S BROADEST LINE OF  
GENERAL PURPOSE ANALOG COMPUTERS  
INCLUDES SUCH IMPORTANT FEATURES AS:**

■  $\pm 100$  volt reference ■ Full  $\pm 150$  volt operating range ■ True high speed overload (voltage/current) indication — provision for instantaneous "hold" or "reset" upon overload signal ■ 0.01% linear computing elements ■ Wide bandwidth non-linear devices — multipliers,  $X^2$ , sine-cosine, log X diode function generators ■ Stored program variable diode function generator ■ 8 input resistors for summer-integrators ■ Four adjustable polystyrene capacitors per integrator ■ Removable color coded patchboards with balanced, field proven layout for simplified programming ■ Patchboard terminated interconnects for slaving and input/output equipment ■ Control logic

system with separate patchboard ■ High speed repetitive and iterative operation ■ Continuous independent adjustment of reset and operate periods ■ Individual control of integrator modes (reset, operate, hold, track-hold, switch) ■ Electronic or reed relay mode control switching ■ Electronic comparators and track-hold units ■ Logic controlled function switches ■ Pushbutton computer control and address selection of amplifier outputs and trunks ■ Provision for rack mount equipment—DVM, oscilloscope, function generators, etc. ■ Balanced design wherein all computing elements have comparable dynamic performance.

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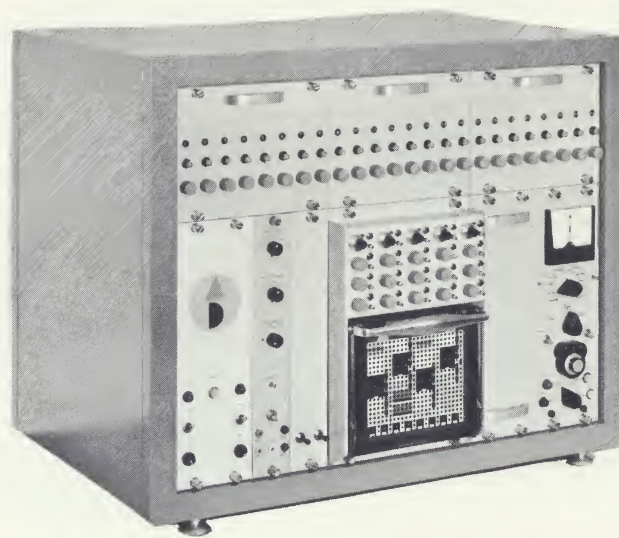


**AD-24** A popular, compact, desk top computer being used equally effectively for classroom and laboratory instruction in analog computation as well as a versatile tool for the individual research engineer.

**THE AD-24 EXPANSION INCLUDES:**

■ 8 Integrator amplifiers ■ 16 Summer-Inverter Amplifiers ■ 20 Coefficient Potentiometers ■ 3 Multipliers ■ 4 Diode function generators (Sin, Cos, Log,  $X^2$ , or arbitrary) ■ 2 Reference selector switches ■ 5 Diode Resistor Networks ■ 2 Comparators ■ 2 Zener Diode Limiters ■ 10 External Trunks

... Plus High Speed Repetitive Operation



AD-24

AD-40

AD-64

AD-80

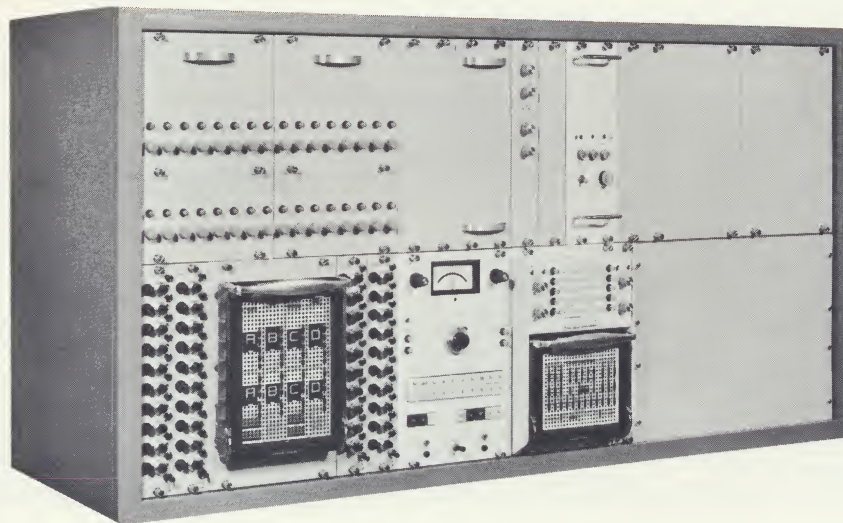
AD-256

**AD-40** A medium size desk top model with integral control logic system and hybrid elements for handling the high speed iterative computation required in problems of time optimal control, two-point boundary value, and parameter search. Ideal for university instruction in analog computation, digital logic and combined operation.

**COMPLEMENT OF EQUIPMENT IN THE AD-40 INCLUDES:**

■ 12 Integrator-Summer Amplifiers ■ 20 Summer Amplifiers ■ 8 Hybrid Amplifiers ■ 40 Potentiometers ■ 4 Reference Selector Switches ■ 5 Multipliers ■ 4 Variable Diode Function Generators ■ 2  $X^2$  DFG ■ 2 Log X DFG ■ 1 Sin X DFG ■ 1 Cos X DFG ■ 40 Trunk lines

... Plus High Speed Repetitive Operation and Control Logic System. In addition provision is made for convenient integral mounting of DVM and Oscilloscope.



AD-40

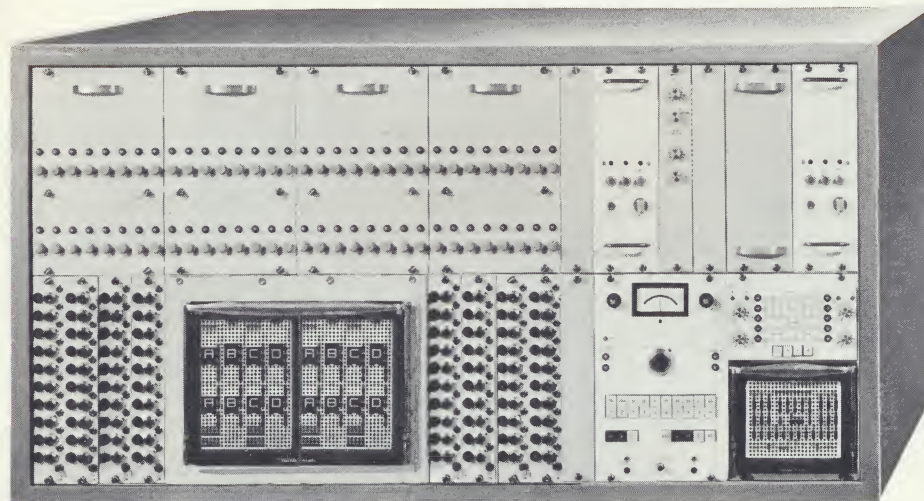
AD-64

AD-80

**AD-64** With 64 amplifiers and control logic, this desk top model offers the flexibility and capacity for solving significant technical problems encountered in the aerospace field, bio-medical research, chemical process simulation, vehicle design and control, and the life sciences.

**A FULL EXPANSION, INCLUDING CONTROL LOGIC AND  
HIGH SPEED REPETITIVE OPERATION CONTROL PROVIDES:**

■ 24 Integrator-Summer Amplifiers ■ 40 Summer Amplifiers ■ 80 Potentiometers ■ 8 Reference Selector Switches ■ 12 Multipliers ■ 4 Variable Diode Function Generators ■ 4  $X^2$  DFG ■ 4 Log X DFG ■ 2 Sin X DFG ■ 2 Cos X DFG ■ 10 Diode Resistor Networks ■ 80 Trunk Lines ■ 18 NOR Gates ■ 6 Combination Gates/Flip-Flops ■ 4 Pulsers ■ 8 Flip-Flops ■ 1 Shift Register ■ 8 Drivers ■ 4 Latching Logic Pushbuttons ■ 10 Free Indicators ■ 10 Momentary Logic Pushbuttons ■ 1 Logic Level Overload System

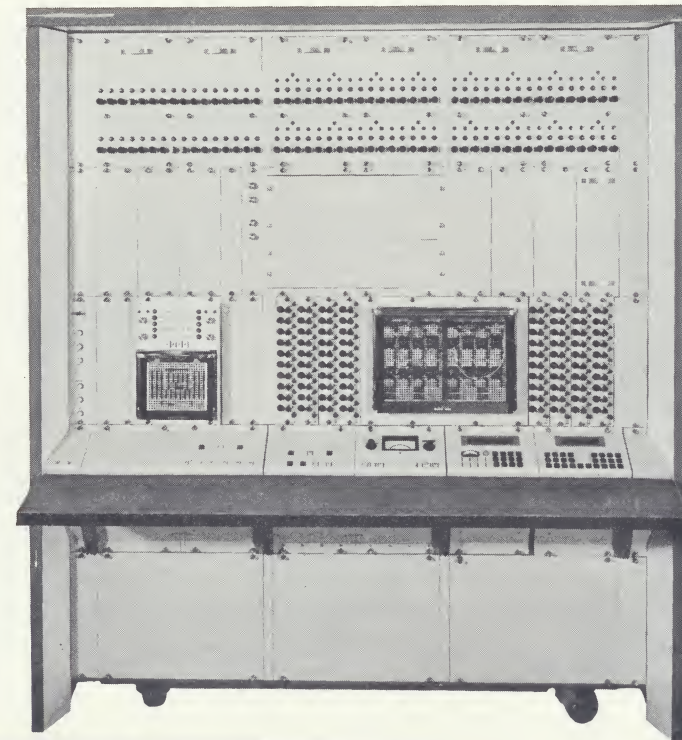




**AD-80** Control features and flexibility found in larger systems have been incorporated in a medium-size console computer capable of full hybrid operation with a digital computer.

**THE PROBLEM-ORIENTED, BALANCED DESIGN OF THE AD-80 AFFORDS THE FOLLOWING TYPICAL COMPLEMENT OF EQUIPMENT:**

■ 24 Integrator-summer amplifiers ■ 40 Summer amplifiers ■ 16 Hybrid amplifiers  
■ 80 Precision coefficient potentiometers (hand-set or servo set) ■ 8 Reference selector switches ■ 10 Multipliers ■ 2 Dual  $X^2$  diode function generators ■ 8 Variable diode function generators ■ 2 Dual log X diode function generators ■ 2 Combination Sine-Cosine diode function generators ■ 6 Diode-resistor networks ■ 10 Hard limiters ■ 12 Comparators ■ 4 Track-hold units ■ 8 Logic controlled analog switches (SPST) ■ 4 Logic controlled function switches w/manual override ■ 1 (Digital voltmeter) ■ 1 (Oscilloscope)  
■ 1 High speed address selector ■ 1 Repetitive operation control unit ■ 1 Control logic system containing: 18 NOR Gates ■ 6 Combination gates/flip-flops ■ 4 Pulsers ■ 1 Four bit shift register ■ 8 Drivers ■ 4 Latching logic pushbuttons ■ 10 Momentary logic pushbuttons ■ 10 Free indicators ■ 1 Logic level overload system ■ 8 Flip-flops



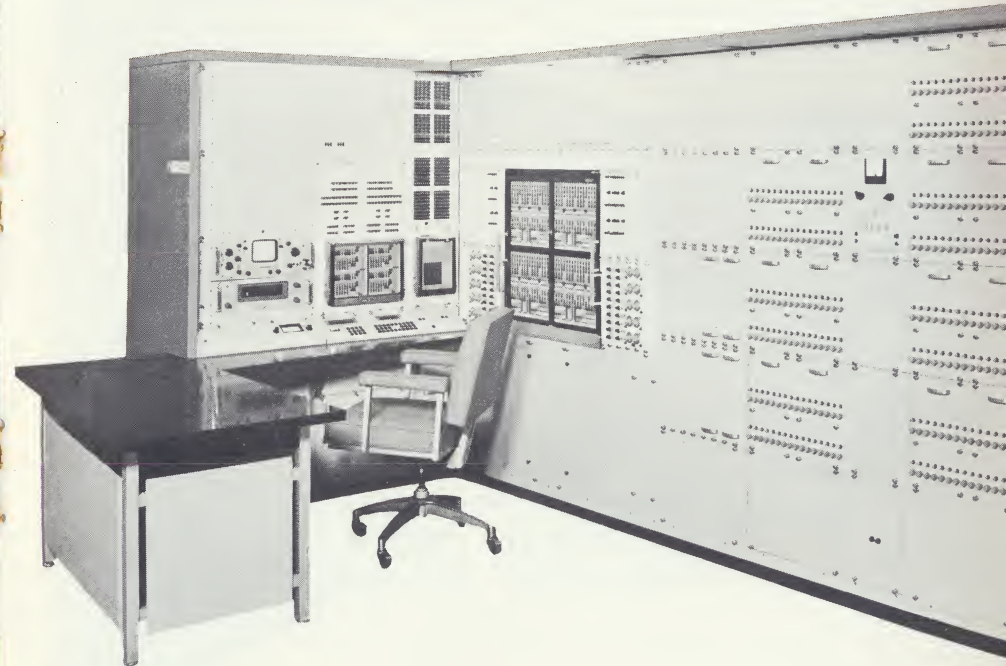


**AD-256** General Purpose Analog Computer System provides state-of-the-art performance and features with extremely large expansion capability. Unique features include: Bipolar Amplifiers, Highest Integrator Performance, High Speed Overload Indication and Recovery, Hard Limiters, Time Scaled Electronic Resolvers with Rate input, Stored Program Diode Function Generators, Low Cost Patching Equipment.

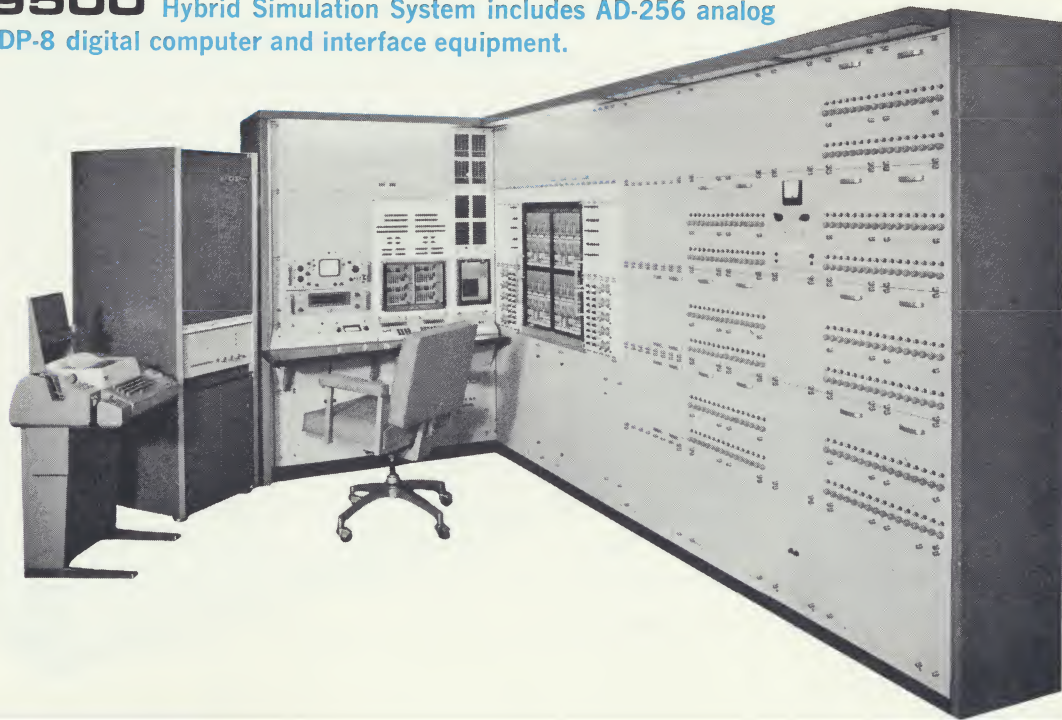
**TYPICAL EXPANSION COMPLEMENT:**

■ 64 Integrators (Electronic Mode Control and 4 Feedback Capacitors Each) ■ 64 Summers  
■ 128 Inverters ■ 160 Servo-Set Coefficient Potentiometers ■ 40 Hand-Set Coefficient Potentiometers ■ 84 Quarter-Square Multipliers (12 Convertible into 24  $X^2$  DFG's) ■ 12 Stored Program Diode Function Generators (20 Segment, 4 Functions) ■ 12 Log X Diode Function Generators ■ 6 Electronic Resolver Channels with Rate Input Capability (each includes a sine-cosine DFG and 4 multipliers) ■ 20 Hard Limiters ■ 24 Dual Diode Networks ■ 16 Free Impedances ■ 8 SPDT Function Switches ■ 16 Reference Selector Switches ■ 32 Electronic Comparators ■ 32 Electronic Switches, SPDT ■ 32 Track Transfer Elements, Stabilized ■ 8 CST Flip-Flops ■ 16 Pulsers ■ 16 Combination Gate/Flip-Flop ■ 32 Logic Gates ■ 4 Shift Registers ■ 32 Drivers ■ 1 Repetitive Control Clock ■ 6 Control Counters (3 Digit) ■ 1 Trunk Patchbay System ■ 1 Non-Linear Overrange Indication System

Monitoring Equipment Consisting of Electronic Digital Voltmeter, High Speed Address Selector, Multichannel Oscilloscope, Plotters and Recorders.

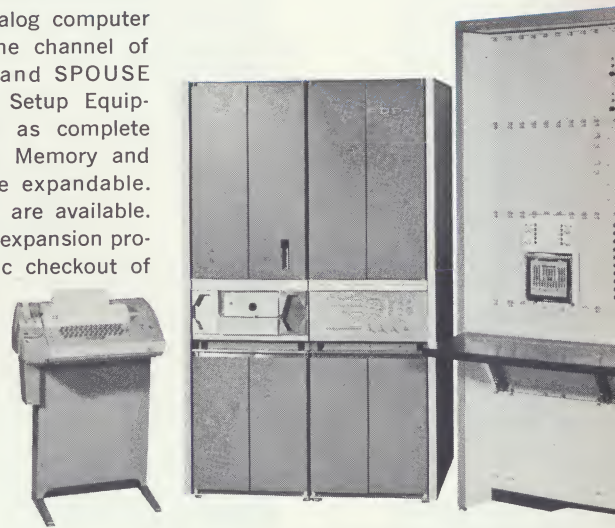


**AD-9500** Hybrid Simulation System includes AD-256 analog console, PDP-8 digital computer and interface equipment.



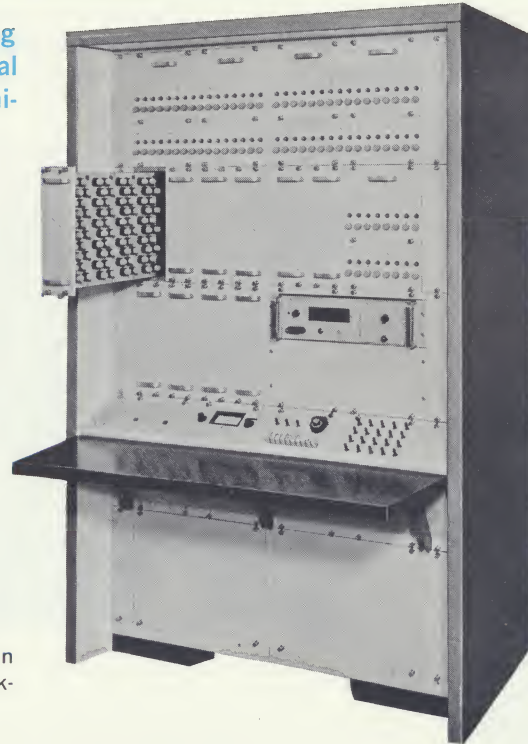
**HyAD-808** Hybrid Simulation System includes AD-80 analog computer and interface.

Basic hybrid systems include 4K memory digital computer, analog computer expanded as desired, one channel of conversion each way and SPOUSE (Stored Program Outlet Setup Equipment) software as well as complete Hybrid Program Library. Memory and conversion channels are expandable. Larger digital computers are available. MAID (Maintenance AID) expansion provides complete automatic checkout of hybrid system.

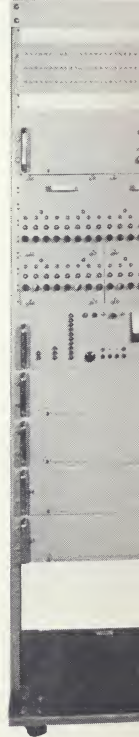
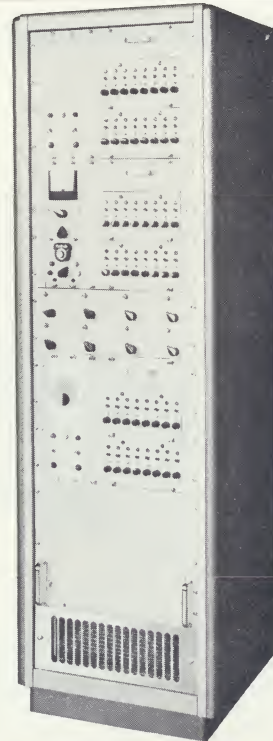


**SPECIAL SYSTEMS** provide analog components packaged and programmed to meet special needs. A unique method of fabricating specials minimizes cost, complexity and delivery time.

VARIABLE DIODE FUNCTION GENERATOR SYSTEM for use in an analog computer laboratory provides off line setup and trunking to different consoles.

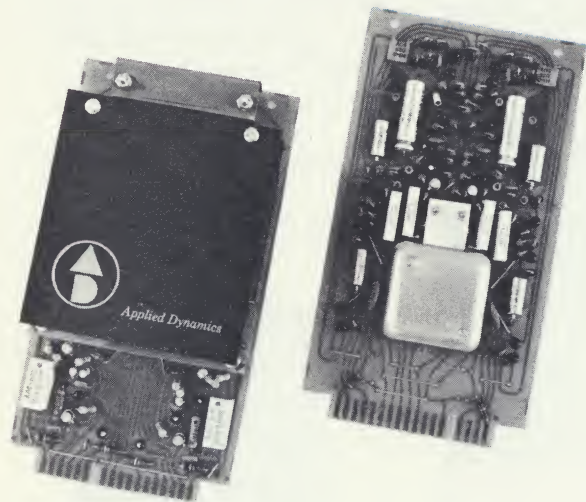


CROSS CORRELATION COMPUTER for continuous data analysis.

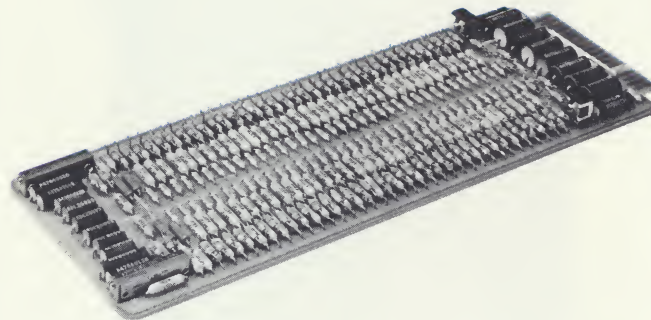




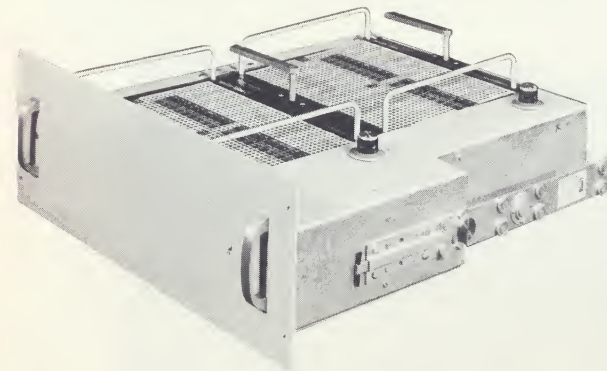
## COMPONENTS for use in special systems or addition to and replacement for existing computers.



Solid-state, all silicon,  $\pm 150$  volt d.c. operational amplifiers, solid-state chopper, short circuit proof, high-speed overload recovery, low noise and low drift.



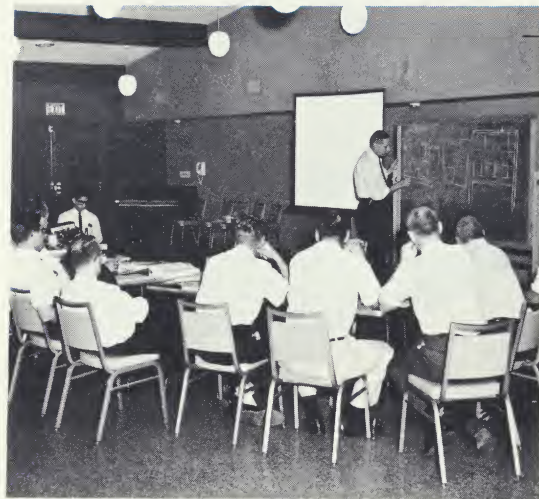
Quarter-Square Multipliers-various accuracies to meet your requirements, simple construction, easily mounted, minimum adjustment needs. Convertible into dual  $X^2$  diode function generator.



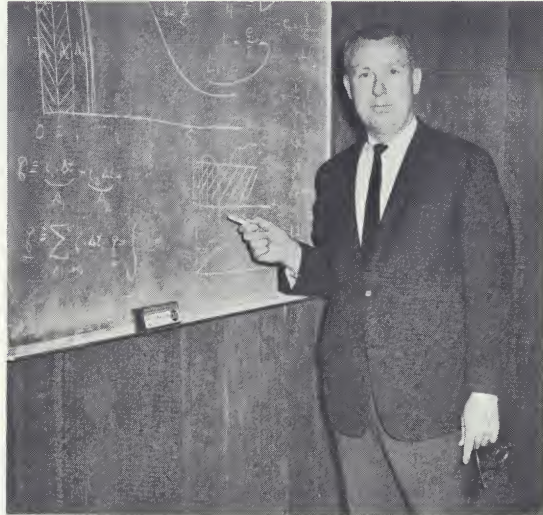
Stored Program Diode Function Generator utilizes removable patch panel for convenient inexpensive storage. Off-line set-up and standard function patching templates are additional features. Flexibility is afforded thru arbitrary assignment of 20 segments among one, two, three or four functions between  $-100$  to  $+100$  volts.

## **SERVICES** Full after-sale support is the function of AD's Customer Service Department.

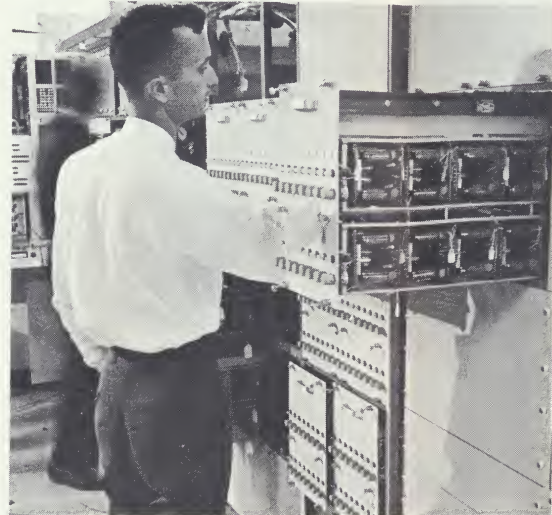
Classes in operation and maintenance of all AD computers are conducted regularly in Ann Arbor. Enrollment in these courses is included in each order. Special classes are also conducted at the customer's location. On the job maintenance training is also conducted during installation.



Applications consulting service in all scientific areas of simulation is offered through a combination of AD staff members and a team of consultants. This is available for support on your problems.



Installation and warranty repair is accomplished by well trained field personnel. On site or part time maintenance contracts as well as factory repair services are offered.





CONTINUING LEADERSHIP IN SOLID STATE **HYBRID** SIMULATION SYSTEMS & COMPONENTS



**APPLIED DYNAMICS**

2275 PLATT RD., ANN ARBOR, MICH. • Ph. 313-665-3601 • TWX 810-223-6050 • Cable COMPUTERS